

# New Terebrid Species from the Eastern Pacific

(Mollusca : Gastropoda)

BY

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(Plate 17)

PILSBRY AND LOWE (1932) were the last to describe a large assemblage of new terebrid species from the Eastern Pacific, bringing the number of known Recent species and subspecies in this province to approximately 45; but they made no attempt to revise any of the previously described species except to refer occasionally to one or more in their comparisons. Of the eleven new species they described, only two are found within the confines of the Gulf of California, *Terebra ligyrus* and *T. ira*. Their study included primarily material collected by H. N. Lowe from Mazatlán to Panama with the exception of some material from Guaymas, Sonora and La Paz, Baja California, both in the southern half of the Gulf of California. The three additional species that are subsequently described were collected from the northern half of the Gulf of California with Guaymas as the southern limit. They were discovered in the course of a general review of the family as it occurs in the Eastern Pacific. Since PILSBRY & LOWE's work, little has been done with the Eastern Pacific terebras until the last five years, a period that has produced six new taxa and several significant extensions of range. Of these six new taxa only one falls within the scope of this paper, *Terebra fitchi* BERRY, 1958, a species described from the outer coast of Baja California.

The family Terebridae is almost exclusively distributed in tropical waters with very few species occurring in the temperate zones; only one species ranges as far north as Santa Barbara, California (34° 20' 21" North Latitude) where it is reported as "rare". The bathymetric range for this group includes the intertidal zone with the probable lower limit at several hundred meters. DALL (1908) records the depth for a specimen of *Terebra lingualis* HINDS, dredged in Panama Bay, as 590 meters with a bottom temperature of 7.7° C. He hastened to point out that he did not consider the species living at that depth. On several occasions I have been on expeditions in the Gulf of California and out of Mazatlán

where living specimens of *T. lingualis* were trawled at depths in excess of 250 m. The optimum habitat for most of the Eastern Pacific species appears to be from mid-tide line to a depth of about 30 m. They seem to prefer a fine sandy bottom where they move about just under the surface, leaving a fairly typical groove behind them. An experienced diver, upon locating one of these trails across the sea floor will usually find the *Terebra* hidden under a small mound at one end of the trail; occasionally an uncovered apex will betray its location.

It is not my intention to review the numerous generic and subgeneric allocations of this family as it would require a complete taxonomic revision to correct the present confused and unsatisfactory arrangement. There is an adequate number of supraspecific taxa from which to choose should such a revision be attempted.

Most workers accept at least three fairly well defined divisions of the family on a generic level. These are based primarily on anatomical studies of the animal. *Terebra, sensu stricto* is typified by having a proboscis that forms a large muscular, evertible sac, in which the prey may be engulfed. There is evidence to suggest that some use a secretion from their poison gland to paralyze their prey. The radula is edentulous; eyes and tentacles are present. *Hastula* ADAMS may be differentiated by finding a radula with toxoglossate teeth as in *Conus*, pierced for the passage of the secretion of the poison gland. Eyes and tentacles are present. *Duplicaria* DALL\* has a radula with a double row of arcuate solid teeth; no poison gland; and the eyes and tentacles are lacking. The species covered in this paper fall into the group *Terebra*, used in a generic sense. Since the supraspecific taxonomy of the family is in such a hopeless state, I have followed previous authors and conservatively as-

\*DALL mistakenly believed that his *Duplicaria* of 1908 was a homonym of *Duplicaria* RAFINESQUE, 1833 and renamed it *Diplomeriza* in 1919. Since *Duplicaria* DALL, 1908 is not an exact homonym, it must be used and *Diplomeriza* DALL, 1919 placed in synonymy.

signed the species under discussion to the subgenus *Strioterebrum* SACCO, 1891.

The group is fairly well represented in the fossil record with a geologic range from the Cretaceous to Recent. A number of the Recent Eastern Pacific species has been recorded from the Pleistocene and a lesser number is represented in the Pliocene of the area. The common Recent species from the Western Atlantic, *Terebra dislocata* (SAY) has been reported by DALL, 1890 from the Miocene to Recent along the Atlantic Coast and as the variety *tantula* CONRAD from the Mississippi Eocene. This same species has been recorded from the Pliocene of Coyote Mountain, Imperial County, California (*vide* GRANT & GALE) by HANNA, 1926 as *T. gausapata* BROWN & PILSBRY; it has also been reported (*vide* GRANT) from the lower Pleistocene of Ventura, California. Since the Atlantic and Pacific Oceans were connected during the Miocene, it is not particularly surprising to find this form, known to have lived along the Atlantic Coast during the Miocene, in the Pliocene and lower Pleistocene of the Pacific Coast.

Only six species have been described from the Tertiary of California. One of these, *Terebra cooperi* ANDERSON, from the Temblor Formation, appears to be a Miocene representative of *Terebra*, *s. s.* PILSBRY & OLSSON (1946) described six new species and one new subspecies from the Jama and Canoa Formations (Pliocene) of Peru. This is an important work to take into account since many of the species described have analogous counterparts living in the Eastern Pacific.

#### TEREBRIDAE H. & A. ADAMS

##### *Terebra* BRUGUIÈRE, 1789

*Terebra* BRUGUIÈRE, Encyclop. Méthod., Vers, vol. 1, p. XV, 1789. (No species cited.) LAMARCK, Mém. Soc. Hist. Nat. Paris, 1799, p. 71. Sole species cited, *Buccinum subulatum* LINNAEUS. (A complete review of systematics concerning the genus *Terebra* may be found in HANNA & HERTLEIN, 1961, and will not be repeated here.) Type (by monotypy, LAMARCK, 1799), *Buccinum subulatum* LINNAEUS, Syst. Nat., Ed. 12, pp. 1205, 1767; Indo-Pacific; Recent.

(Subgenus) *Strioterebrum* SACCO, 1891

*Strioterebrum* SACCO, Molluschi dei Terreni Terziarii del Piemonte e della Liguria, Pt. 10, p. 33, 1891; DALL, Nautilus, vol. 21, p. 249, 1908; Bull. Mus. Comp. Zool., Harvard College, vol. 43, pp. 246, 248, 1908; WOODRING, Carnegie Inst., Publ. No. 385, p. 137, 1928.

"*Myurella* HINDS," COSSMAN, Ess. Paléo. Com., vol. 2, p. 49, 1896, not of HINDS, in SOWERBY'S Thes. Conch., vol. 1, *Terebra*, p. 171, 1845 (*vide* GRANT & GALE).

Type (by original designation), *Terebra basteroti* NYST; Mediterranean region, Miocene.

Shell small or medium sized with a distinct subsutural band and whorls sculptured with axial ribs and spiral threads or grooves throughout.

Geologic range: Cretaceous (*vide* COSSMAN, "*Myurella*"), Eocene (*vide* GRANT & GALE) to Recent.

*Terebra (Strioterebrum) adairensis* CAMPBELL, spec. nov.

(Plate 17, figures 3 to 5)

Shell medium in size, of a uniform light tan color; though beginning with the protoconch of 3½ to 4 black glassy whorls, the ensuing whorls are darker tan lightening anteriorly; early sculpture consists of a subsutural band with prominent tubercles and arched axial ribs; the ribs soon develop into a row of tubercles which, on the later whorls of the shell, are located just above the suture; on the last whorl, these tubercles lengthen to become axial ribs with residual tubercles; the shell has a narrow incised subsutural groove and whorls that are generally flat; it is covered by microscopic spiral striulae with nine to eleven raised spiral cords that intercept the axial sculpture to produce small nodes; there are eight to nine additional cords on the base; siphonal fasciole concave, anterior canal recurved, columella without plicae, aperture elongate.

**Holotype:** California Academy of Sciences, Department of Geology, Type Collection No. 12539

**Paratypes:** Two paratypes, collected with the holotype, are in the collection of Dorothy Brown, Los Angeles; two additional paratypes are in the collection of Mark Rogers, Loma Linda, California. See Table 1.

**Type Locality:** Bahía de Adair, approximately 15 miles north of Puerto Peñasco, Sonora, México (31° 24' North Latitude; 113° 43' West Longitude).

**Range:** Three specimens from San Luis Gonzaga Bay extend the range of this species to the eastern shore of Baja California, México, though it still appears to be limited to the northern portion of the Gulf of California.

*Terebra adairensis* belongs to a group of related species which includes *T. tuberculosa* HINDS, 1844 (Plate 17, figures 6 and 7), *T. cracilenta* LI, 1930 (Plate 17, figures 8 and 9), and *T. roperi* PILSBRY & LOWE, 1932 (Plate 17, figures 1 and 2). These species have in common one or more rows of tubercles sculpturing the whorls below the subsutural band. The most elaborately ornamented is *T. cracilenta* which may have up to nine primary and secondary rows of tubercles on the body whorl. *Terebra tuberculosa* is similar to *T. cracilenta* but has fewer rows and the tubercles are further apart.

With the exception of *Terebra cracilenta* the protoconchs of all are quite similar, consisting of 3½ to 4 whorls. That of *T. cracilenta* is more inflated and has traces of axial ribs on the last 1½ whorls as seen through a microscope. The early sculpture of *T. roperi* shows a



narrow subsutural band of nodes which lacks a well-defined subsutural groove and prominent axial ribs which end peripherally in tubercles. In contrast, *T. adairensis* has a greater apical angle and wide subsutural bands set off by subsutural grooves. The axial ribs are low with the peripheral tubercles less prominent. The axial ribs of *T. tuberculosa* are sharply protruding and only later do they develop into two rows of tubercles, the peripheral row appearing first. *Terebra cracilenta* displays similar axial ribs, but very early there appears a small row of nodes two-thirds the way down the axial ribs; within three or four more whorls a row of nodes develops below and two or more rows above this initial row thus allowing for quick identification of this species.

*Terebra (Strioterebrum) churea* CAMPBELL, spec. nov.

(Plate 17, figures 17, 18 and 24)

Shell small and slender, of white to light cream color, initial portion of the protoconch is dome-shaped and continues as a smooth glassy whorl of one and one-half turns followed by twelve whorls of the teleoconch; early sculpture of sharp axial ridges much narrower than the interspaces, later whorls convex with an impressed subsutural band on which there are axially lengthened curved nodes with convex portion to the left; there are nine axial cords distributed between the 22 to 24 axial ribs which are narrower than the interspaces and arched with the convex portion to the right; the last whorl contains twelve axial cords with two additional cords confined to the anterior canal; siphonal fasciole concave, columella with a faint suggestion of a fold; aperture elongate, anterior canal recurved.

**Holotype:** Santa Barbara Museum of Natural History Type Collection No. 03461.

**Paratypes:** One paratype is in the Type Collection of the Santa Barbara Museum of Natural History (No. 03462); two in the Type Collection of the San Diego Society of Natural History (Nos. 45222 and 45223); four in the John Q. and Rose Burch collection; two in the LeRoy Poorman collection; one in the B. Campbell collection; and one in the Mark Rogers collection.

**Type Locality:** The holotype was collected from the shore of Ensenada San Francisco, Guaymas, México, a long shallow bay that joins Bacochibampo Bay with San Carlos Bay. All of the paratypes were collected within a three mile radius of this area with the exception of Lowe's material for which the locality is merely given as "Guaymas". "La Grassa Id." is a small island just off the shore and within Ensenada San Francisco (27° 58' North Latitude; 111° 03' West Longitude). See Table 2.

This rare species shares several features with a group of small *Terebra* described by PILSBRY & LOWE (1932), *T. polypenus*, *T. corintoensis*, *T. montijoensis* and *T. sanjuanensis*. They are all generally less than 20 mm in length, with convex whorls sculptured by numerous axial ribs and spiral cords or grooves. I am indebted to Mr. Emery Chacé for the opportunity to compare *T. churea* with paratypes of the PILSBRY & LOWE species in the Type Collection of the San Diego Society of Natural History.

I have at hand photographs of the holotypes of most of the species described from the Eastern Pacific; with these and the comparative material, *T. churea* can be readily distinguished from the previously described species.

### Explanation of Plate 17

- Figure 1: *Terebra roperi* PILSBRY & LOWE. (ex Campbell Collection) Chamela Bay, México. (x 3)  
 Figure 2: Protoconch of Paratype SDSNH No. 502 b (x 5). Figure 3: *Terebra adairensis* CAMPBELL, spec. nov. Holotype, CAS No. 12539. (x 1½) Figure 4: *Terebra adairensis*. Paratype 2 (ex Brown Collection) Protoconch. (x 5) Figure 5: Same shell as in previous figure (x 2½) Figure 6: *Terebra tuberculosa* HINDS. (ex Campbell Collection) El Salvador; Protoconch (x 5) Figure 7: Same shell as in previous figure (x 2)  
 Figure 8: *Terebra cracilenta* LI. (ex Campbell Collection) Tonalá, Chiapas, México. Protoconch (x 5)  
 Figure 9: Same shell as in previous figure. (x 2) Figure 10: *Terebra ninfae* CAMPBELL. Puerto Madero, Chiapas, México. (x 5) Figure 11: Same shell as in previous figure. Protoconch (x 6) Figure 12: *Terebra dushanae* CAMPBELL, spec. nov. Holotype, CAS No. 12532 (x 5) Figure 13: Same shell as in previous figure. Protoconch (x 6) Figure 14: *Terebra bridgesi* DALL. (ex Campbell Collection) Puerto Madero, Chiapas, México (x 5½) Figure 15: Same shell as in previous figure. Protoconch (x 6) Figure 16: *Terebra bridgesi*. DALL. Lectotype USNM 9404 (James McLean, photo) (x 4) Figure 17: *Terebra churea* CAMPBELL, spec. nov. Paratype SDSNH 45222. Protoconch (x 5) Figure 18: *Terebra churea*. Paratype SBMNH No. 03462 (x 3)  
 Figure 19: *Terebra tiarella* DESHAYES. Paratype of *T. fitchi* BERRY (ex Campbell Collection) (x 2)  
 Figure 20: Same shell as in previous figure. Protoconch (x 5) *Terebra tiarella*. Holotype of *T. fitchi* BERRY. (ex Stanford Collection, No. SU 24715. Stanford University, photo. (x 1½) Figures 22, 23: *Terebra tiarella*. Co-types British Museum (Natural History) Dr. Robert Robertson, photo. (x1½) Figure 24: *Terebra churea*. Holotype. SBMNH No. 03461 (x 3) All photos by B. Campbell, except as otherwise noted.

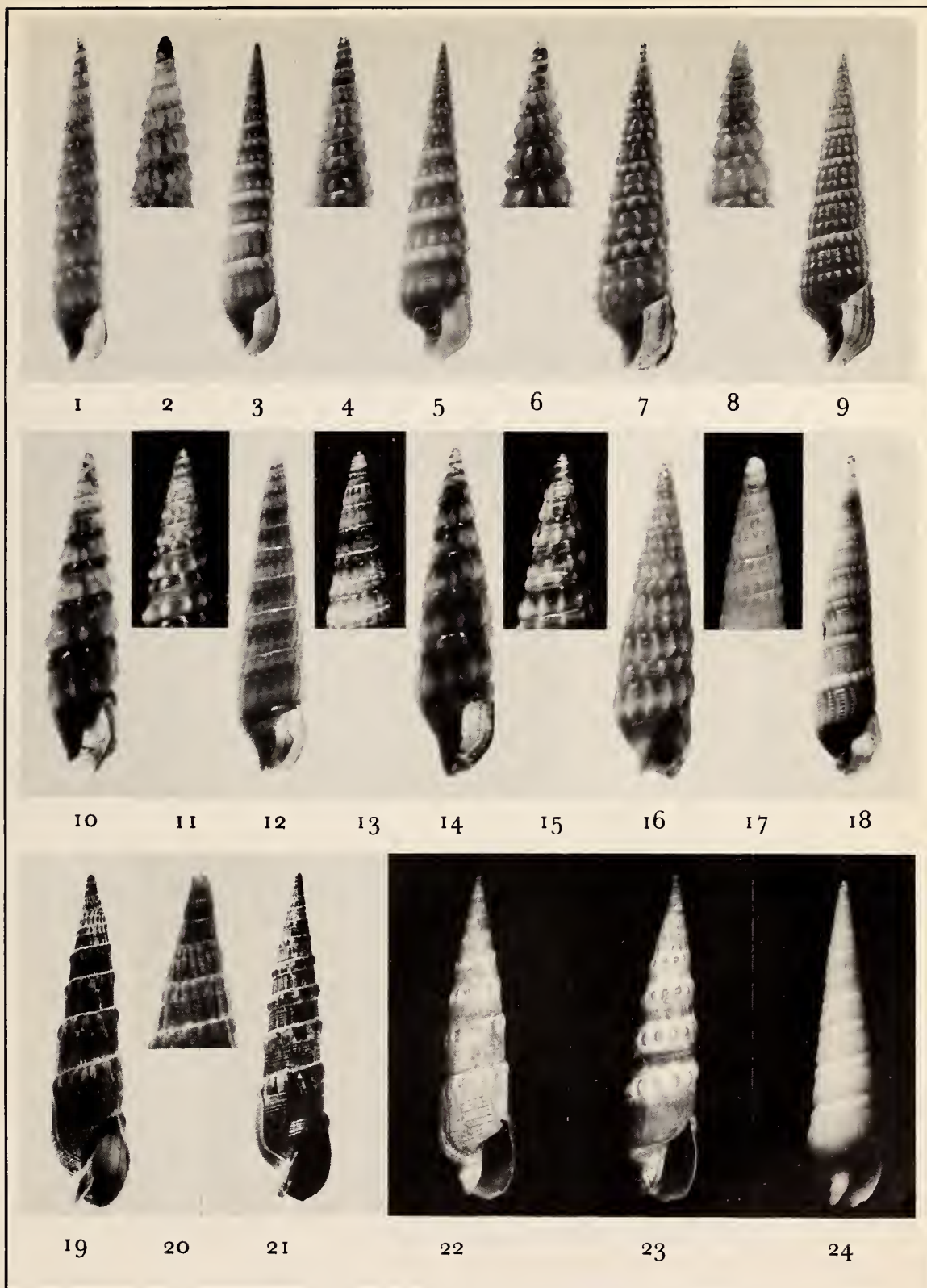






Table 1

*Terebra (Strioterebrum) adairensis* CAMPBELL, spec. nov.  
(measurements in millimeters)

Specimen	Collection	Locality	Collector	width	length
Holotype	CAS 12539	Bahía de Adair, Sonora, México	Dorothy Brown	29.5	5.7
Paratypes 1 - 2	Brown coll.	Bahía de Adair, Sonora, México	Dorothy Brown	28.2	5.6
				19.7	4.8
Paratype 3	Rogers coll.	Bahía de Adair, Sonora, México	Mark Rogers	15.6	3.8
Paratype 4	Rogers coll.	Puerto Peñasco, Sonora, México	Mark Rogers	23.4	5.3
Hypotypes 1 - 2	Campbell coll.	San Luis Gonzaga Bay, B. C., México	B. Campbell	22.4	5.1
				20.6	5.2
Hypotype 3	Burch coll.	San Luis Gonzaga Bay, B. C., México	J. Q. Burch	15.4	3.9

The protoconch of *Terebra churea* serves as a differentiating character between it and the other small Panamic terebras; initially it is an eccentric dome followed by 1 to 1½ whorls. The protoconchs of the other small terebras have the usual 3 to 4 enlarging whorls usually associated with *Strioterebrum*. Since the remaining characters of *T. churea* are compatible with an assignment to *Strioterebrum* it is tentatively allocated to this subgenus.

*Terebra (Strioterebrum) dushanae* CAMPBELL, spec. nov.

(Plate 17, figures 12 and 13)

1961 *Terebra bridgesi* DALL, G. B. CAMPBELL, The Veliger 4 (1): 28, fig. 11 (not *T. bridgesi* DALL, 1908).

1961 *Terebra (Microtrypetes) sp.* J. H. McLEAN, Trans. San Diego Soc. Nat. Hist. 12 (28): 471. "Probably new".

1962 *Terebra cf. T. bridgesi* DALL, H. DUSHANE, The Veliger 5 (1): 49.

Shell minute, color brown with a light tan peripheral band which, on the earlier whorls, includes all but the subsutural band that remains brown; protoconch of 4½ glassy whorls of which the upper one third of each whorl

is brown and the remainder clear; the third whorl is the most inflated and usually the largest; the teleoconch consists of nine whorls; initial sculpture of straight axial ribs that are sharp and although separated by a fine line, are continuous and usually in line with the subsutural nodes; nodes and ribs are white; spiral sculpture indistinct other than the subsutural groove that divides the posterior third of the whorl; there may be one or two fine lines on the whorl proper, or none; the last whorl has 18 axial ribs; aperture elongate, anterior canal short and open; animal white.

**Holotype:** California Academy of Sciences, Department of Geology Type Collection No. 12532.

**Paratypes:** Since this species has been taken in number by several collectors, paratypes will be deposited in a number of major institutions. Other paratypes will remain in the collections cited in Table 3.

**Type Locality:** Specimens were collected at a low tide on sandbars, at Puertecitos, Baja California, México (30° 25' North Latitude; 114° 39' West Longitude).

This species belongs to a small group of minute terebras which are found in the Eastern Pacific among which are

Table 2

*Terebra (Strioterebrum) churea* CAMPBELL, spec. nov.  
(measurements in millimeters)

Specimen	Collection	Locality	Collector	width	length
Holotype	SBMNH 03461	Ensenada San Francisco, Guaymas, México	Churea Expedition	17.4	3.9
Paratype 1	SBMNH 03462	dredged in 20 m, Bacochibampo Bay, Guaymas	Churea Expedition	15.7	3.6
Paratypes 2 - 5	Burch coll.	"La Grassa Id.", Guaymas, México	Rose Burch	14.4	3.2
				10.2	2.4
Paratypes 6 - 7	SDSNH 45222	Guaymas, México	H. N. Lowe	13.9	2.9
	SDSNH 45223			11.0	2.6
Paratypes 8 - 9	Poorman coll.	dredged in 20 m, off San Carlos Bay, Guaymas	LeRoy Poorman	8.8	2.5
				8.6	2.3
Paratype 10	Campbell coll.	dredged in 20 m, Bacochibampo Bay, Guaymas	B. Campbell	11.2	2.6
Paratype 11	Rogers coll.	dredged in 50 m, off Cabo Haro, Guaymas	Mark Rogers	7.4	1.8
			Ariel Expedition		

*Terebra bridgesi* DALL (Plate 17, figures 14 to 16) and *T. ninfae* CAMPBELL, 1961 (Plate 17, figures 10 and 11). *Terebra dushanae* has been recorded on several occasions in check lists of the Gulf of California as "*T. bridgesi* DALL", a species described from Panama. It was Mrs. Faye Howard who first recognized that this shell, living in the northern Gulf, was new to science and JAMES McLEAN (1961) reported it in his Bay of Los Angeles check list as "*Terebra (Microtrypetes) sp.*" A photograph of the lectotype of *T. bridgesi* DALL (Plate 17, figure 16), supplied by James McLean, and specimens of *T. bridgesi* from the Guatemala border provided the evidence that showed *T. dushanae* to be a distinct species. *Terebra dushanae* has consistently 50% more axial ribs, which are narrower, straighter, and less convex than in *T. bridgesi*. *Terebra bridgesi* has eight to ten spiral lines on each whorl and prominent subsutural grooves in contrast to *T. dushanae* which may have one to two spiral lines per whorl and ill-defined subsutural grooves. The remaining minute Panamic species, *T. mariato* PILSBRY & LOWE, 1932, has been placed in the subgenus *Microtrypetes*, which lacks a subsutural band altogether.

This species is named in honor of Mrs. Helen DuShane who was the first to compile and publish a complete check-list of the Puertecitos molluscan fauna.

*Terebra (Strioterebrum) tiarella* DESHAYES, 1857  
(Plate 17, figures 19 to 23)

- 1857 *Terebra tiarella* DESHAYES. Jour. Conchyl. 6: 91, pl. 5, fig. 7.  
1859 *Terebra tiarella* DESHAYES. Proc. Zool. Soc. London, p. 276. Not figured.  
1860 *Terebra tiarella* DESHAYES, L. REEVE, Conch. Icon., 13, pl. 21, sp. 109 a, b.  
1885 *Terebra tiarella* DESHAYES, G. W. TRYON, Jr., Man. Conch., 7: 8; pl. 12, figs. 38, 39.  
1931 "*Terebra (Strioterebrum) albocincta* (CARPENTER) variety *hindsii* (CARPENTER)", U. S. GRANT, IV & H. R. GALE, Mem. San Diego Soc. Nat. Hist. 1: 469; pl. 32, fig. 35.  
1958 *Terebra (Strioterebrum) fitchi* BERRY, Leaflets in Malacol., 1 (15): 89, 90. Not figured.  
1958 *Terebra (Strioterebrum) fitchi* BERRY, A. M. KEEN, Sea shells of tropical west America, p. 491, fig. 962 a.

(these citations are only those considered to be pertinent, hence the list is not complete.)

Shell of medium size, slender, slopes nearly straight. Whorls about thirteen; protoconch smooth, glassy, and dark red, of 1½ whorls with an initial eccentric dome

Table 3

*Terebra (Strioterebrum) dushanae* CAMPBELL, spec. nov.  
(measurements in millimeters)

Specimen	Collection	Locality	Collector	width	length
Holotype	CAS 12532	Puertecitos, Baja Calif., México	Donald Shasky	9.2	1.9
Paratypes 1 - 13	Shasky coll.	Puertecitos, Baja Calif., México	Donald Shasky	11.4 6.8	2.5 1.7
Paratypes 14 - 51	DuShane coll.	Puertecitos, Baja Calif., México	Helen DuShane	11.5 5.0	2.5 2.0
Paratypes 52 - 54	Sphon coll.	Puertecitos, Baja Calif., México	Gale Sphon, Jr.	7.2 4.8	2.0 1.2
Hypotype 1	SBMNH 03463	Bahía de Los Angeles, B. C., México	Faye Howard	6.9	1.8
Hypotypes 2 - 4	Burch coll.	San Luis Gonzaga Bay, B. C., México	J. Q. & R. Burch	7.3 7.0	1.9 1.8
Hypotypes 5 - 25	Campbell coll.	Agua de Chale, B. C., México	B. Campbell	10.0 6.6	2.1 1.7
Hypotypes 26 - 39	Shasky coll.	Agua de Chale, B. C., México	Donald Shasky	8.1 6.8	2.0 1.7
Hypotype 40	Howard coll.	Agua de Chale, B. C., México	Faye Howard	7.0	1.8
Hypotypes 41 - 50	DuShane coll.	Agua de Chale, B. C., México	Helen DuShane	9.0 6.5	2.0 2.0
Hypotypes 51 - 59	Sphon coll.	San Felipe, Baja California, México	Gale Sphon, Jr.	10.8 6.7	2.6 1.6